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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/678,820	10/03/2003	Akio Yamamoto	IIW-031RCE	3272

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EXAMINER	
CREPEAU, JONATHAN	

ART UNIT	PAPER NUMBER
1745	

MAIL DATE	DELIVERY MODE
08/10/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/678,820	YAMAMOTO ET AL.	
	Examiner	Art Unit	
	Jonathan S. Crepeau	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 June 2007*.
2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.
3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *25-34* is/are pending in the application.
 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5)☐ Claim(s) _____ is/are allowed.
6)☒ Claim(s) *25-28,31 and 32* is/are rejected.
7)☒ Claim(s) *29,30,33 and 34* is/are objected to.
8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.
10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a)☐ All b)☐ Some * c)☐ None of:
  1.☐ Certified copies of the priority documents have been received.
  2.☐ Certified copies of the priority documents have been received in Application No. _____.
  3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
 * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
 Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
 Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on June 25, 2007 has been entered.

This Office action addresses claims 1-14 and newly added claims 25-34. Claims 1-14 remain withdrawn from consideration. Claims 25-28, 31, and 32 are newly rejected under 35 USC 103. Claims 29, 30, 33, and 34 are objected to as containing allowable subject matter. This action is non-final.

In the first section of the remarks, Applicants indicate that no acknowledgement was made of the receipt of a certified copy of priority documents filed October 3, 2003. However, such acknowledgement was made on October 26, 2006, and is confirmed herein by this statement.

Claim Rejections - 35 USC § 103

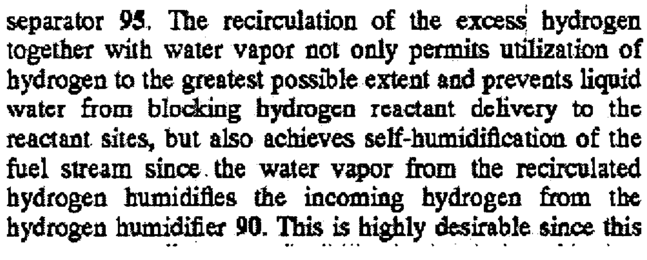
2. Claims 25 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 2000-357530 in view of Cargnelli et al (2003/0194590) in view of Rozendaal (U.S. Patent 4,853,045).

JP '530 is directed to a fuel cell apparatus comprising a diluting device (40) (see Fig. 1). The device comprises a reservoir through which exhaust hydrogen is diluted by exhaust air ("ventilating fluid") from the cathode (see [0029]). The cathode air is supplied by a fan (blower) (27, 41) (see [0028]).

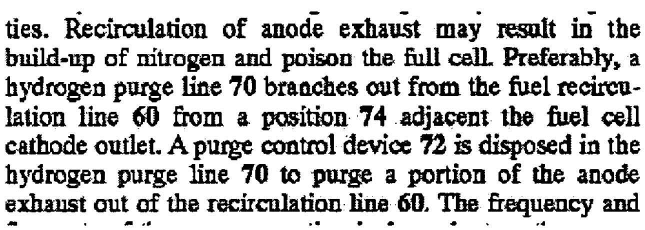
The reference does not expressly teach a hydrogen recirculation piping system connected to the anode and to the reservoir, as recited in claim 25.

Cargnelli et al. is directed to a fuel cell system comprising a hydrogen recirculation line (60) and a purge line (70) connected thereto.

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to use the recirculation and purge lines of Cargnelli in the system of JP '530. In [0035] and [0036], Cargnelli et al. teach the following:



separator 95. The recirculation of the excess hydrogen together with water vapor not only permits utilization of hydrogen to the greatest possible extent and prevents liquid water from blocking hydrogen reactant delivery to the reactant sites, but also achieves self-humidification of the fuel stream since the water vapor from the recirculated hydrogen humidifies the incoming hydrogen from the hydrogen humidifier 90. This is highly desirable since this



ties. Recirculation of anode exhaust may result in the build-up of nitrogen and poison the full cell. Preferably, a hydrogen purge line 70 branches out from the fuel recirculation line 60 from a position 74 adjacent the fuel cell cathode outlet. A purge control device 72 is disposed in the hydrogen purge line 70 to purge a portion of the anode exhaust out of the recirculation line 60. The frequency and

Accordingly, as set forth in the above passages, the artisan would have sufficient motivation to use the recirculation and purge lines of Cargnelli in the system of JP '530.

JP ‘530 further does not expressly teach that air is supplied to the reservoir after stopping generation of electric power, as recited in claim 25.

However, it is submitted that the artisan would be motivated to perform this step while operating the apparatus of JP ‘530. Such a step would allow the apparatus, upon shutdown, to be in a state where residual hydrogen is not present in the exhaust pipes and reservoir, thereby increasing the safety of the apparatus. As such, this limitation in claim 25 would be rendered obvious.

JP ‘530 further does not expressly teach that the blower is operated for a predetermined period of time after stopping power generation, the time being calculated from a capacity of the reservoir and an amount of hydrogen discharged from the fuel cell.

Rozendaal is directed to a method for manufacturing rare earth transition metal alloy magnets. The reference discloses a reservoir (1) and a nitrogen gas supply (5). In column 4, line 4, the reference teaches that “when purging is complete, a condition which is determined by a time period dependent on the capacity of the vessel 1 and the nitrogen flow rate, the controller 7 closes the nitrogen supply valve 6 and opens a further supply valve 10.”

Therefore, the subject matter of claim 25 would have been obvious to one of skill in the art because the purging technique of JP ‘530 was recognized as part of the ordinary capabilities of one skilled in the art. In this case, the purge system of JP ‘530 could be modified by including the purging technique disclosed by Rozendaal. The application of the technique of Rozendaal would have yielded predictable results in the apparatus of JP ‘530 since the purge time of hydrogen could be calculated based on reservoir capacity and hydrogen flow rate. As such, the subject matter of claim 25 is rendered obvious.

3. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP '530 in view of Cargnelli in view of Rozendaal as applied to claims 25 and 28 above, and further in view of JP 3-10077.

JP '530 does not expressly teach that the cathode exhaust pipe is arranged in the reservoir and hydrogen is sucked through holes in the pipe and discharged with cathode exhaust to the outside.

JP '077 is directed to a CVD device comprising a diluting device on the outlet thereof. The diluting device comprises a pipe (6) having holes for sucking a diluting gas into the pipe from a reservoir (2).

Therefore, the subject matter of claim 27 would have been obvious to one of skill in the art because the dilution technique of JP '077 was recognized as part of the ordinary capabilities of one skilled in the art. In this case, the system of JP '530 could be modified by including the dilution device disclosed by JP '077. The application of the dilution technique of JP '077 would have yielded predictable results in the apparatus of JP '530. Although JP '077 discloses that the gas to be diluted flows through the pipe, whereas claim 27 specifies that the gas to be diluted (hydrogen) is sucked into the holes, it would be obvious to operate the device of JP '077 in the manner specified by claim 27. It is submitted that the artisan would be sufficiently skilled to operate the device in either configuration in attempting to obtain an efficient dilution process.

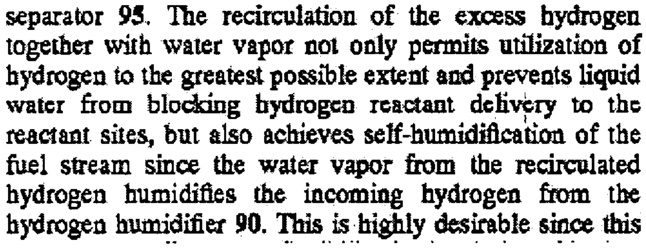
4. Claims 26 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 2000-357530 in view of Cargnelli et al. in view of Margiott et al (U.S. Pre-Grant Publication No. 2003/0087138).

JP '530 is directed to a fuel cell apparatus comprising a diluting device (40) (see Fig. 1). The device comprises a reservoir through which exhaust hydrogen is diluted by exhaust air ("ventilating fluid") from the cathode (see [0029]). The cathode air is supplied by a fan (blower) (27, 41) (see [0028]).

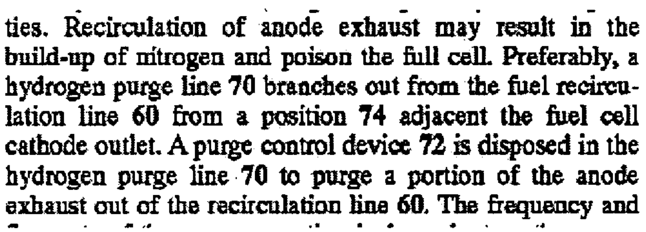
The reference does not expressly teach a hydrogen recirculation piping system connected to the anode and to the reservoir, as recited in claim 26.

Cargnelli et al. is directed to a fuel cell system comprising a hydrogen recirculation line (60) and a purge line (70) connected thereto.

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to use the recirculation and purge lines of Cargnelli in the system of JP '530. In [0035] and [0036], Cargnelli et al. teach the following:



separator 95. The recirculation of the excess hydrogen together with water vapor not only permits utilization of hydrogen to the greatest possible extent and prevents liquid water from blocking hydrogen reactant delivery to the reactant sites, but also achieves self-humidification of the fuel stream since the water vapor from the recirculated hydrogen humidifies the incoming hydrogen from the hydrogen humidifier 90. This is highly desirable since this



ties. Recirculation of anode exhaust may result in the build-up of nitrogen and poison the full cell. Preferably, a hydrogen purge line 70 branches out from the fuel recirculation line 60 from a position 74 adjacent the fuel cell cathode outlet. A purge control device 72 is disposed in the hydrogen purge line 70 to purge a portion of the anode exhaust out of the recirculation line 60. The frequency and

Accordingly, as set forth in the above passages, the artisan would have sufficient motivation to use the recirculation and purge lines of Cargnelli in the system of JP '530.

JP '530 further does not expressly teach that air is supplied to the reservoir after stopping generation of electric power, as recited in claim 26.

However, it is submitted that the artisan would be motivated to perform this step while operating the apparatus of JP '530. Such a step would allow the apparatus, upon shutdown, to be in a state where residual hydrogen is not present in the exhaust pipes and reservoir, thereby increasing the safety of the apparatus. As such, this limitation in claim 26 would be rendered obvious.

JP '530 further does not expressly teach that the blower is operated until the concentration of hydrogen in the reservoir (monitored using a sensor) is below a predetermined value.

Margiott et al. is directed to a shutdown procedure using an air purge for a fuel processing system of a fuel cell. In [0036], the reference teaches that a hydrogen sensor is placed as at the outlet of a reformer and is used to automatically close certain valves when the hydrogen concentration is below a predetermined safe level, which is disclosed as 4% or less, preferably 1% or less by volume.

Therefore, the subject matter of claim 26 would have been obvious to one of skill in the art because the air purging technique of Margiott et al. was recognized as part of the ordinary capabilities of one skilled in the art. In this case, the system of JP '530 could be modified by including the purging technique (i.e., sensor in purge outlet area) disclosed by Margiott. The application of the purging technique of Margiott et al. would have yielded predictable results in the apparatus of JP '530. In particular, it is clear from Margiott et al. that the hydrogen concentration must be under a specific threshold in the interest of safety when hydrogen and air are present. Such would also be the case in the reservoir of JP '530, and accordingly the use of the sensor of Margiott in this reservoir would have been advantageous.

5. Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP '530 in view of Cargnelli in view of Margiott et al. as applied to claims 26 and 32 above, and further in view of JP 3-10077.

JP '530 does not expressly teach that the cathode exhaust pipe is arranged in the reservoir and hydrogen is sucked through holes in the pipe and discharged with cathode exhuast to the outside.

JP '077 is directed to a CVD device comprising a diluting device on the outlet thereof. The diluting device comprises a pipe (6) having holes for sucking a diluting gas into the pipe from a reservoir (2).

Therefore, the subject matter of claim 31 would have been obvious to one of skill in the art because the dilution technique of JP '077 was recognized as part of the ordinary capabilities of one skilled in the art. In this case, the system of JP '530 could be modified by including the dilution device disclosed by JP '077. The application of the dilution technique of JP '077 would have yielded predictable results in the apparatus of JP '530. Although JP '077 discloses that the gas to be diluted flows through the pipe, whereas claim 31 specifies that the gas to be diluted (hydrogen) is sucked into the holes, it would be obvious to operated the device of JP '077 in the manner specified by claim 31. It is submitted that the artisan would be sufficiently skilled to operate the device in either configuration in attempting to obtain an efficient dilution process.

Response to Arguments

6. Applicant's arguments filed January 26, 2007 have been fully considered but they are not persuasive inosofar as they apply to the present rejections. Applicants state that the "jet pipe" (40) of JP '530 is not synonymous with a reservoir. However, it is submitted that a "reservoir" is merely something that is capable of holding something else, and the "jet pipe" of JP '530 may be broadly construed as a reservoir. Thus, Applicant's argument is not persuasive.

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Crepeau whose telephone number is (571) 272-1299. The examiner can normally be reached Monday-Friday from 9:30 AM - 6:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan, can be reached at (571) 272-1292. The phone number for the organization where this application or proceeding is assigned is (571) 272-1700. Documents may be faxed to the central fax server at (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jonathan Crepeau
Primary Examiner
Art Unit 1745
August 8, 2007